MIL-E-1/1519A
6 JANUARY 1971
SUPERSEDING
MIL-E-1/1519
14 October 1963

MILITARY SPECIFICATION SHEET

ELECTRON TUBE, NUMERICAL INDICATOR

TYPE 8422

The complete requirements for procuring the electron tube described herein shall consist of this document and the latest issue of Specification MIL-E-1.

This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

DESCRIPTION: Gas filled, glow discharge (neon), cold cathode

PIN CONNECTIONS AND DIMENSIONS: See figure 1

ABSOLUTE-MAXIMUM RATINGS:

Parameter:	Ebb	Ik (individual)	Rp	TA	Alt
Unit:	Vdc	mA	Ohms	°C	ft
Maximum:	---	3.5	---	+55	70,000
Minimum:	170	---	---	-20	---
TEST CONDITIONS:	170	---	8.2K±1%	---	---

GENERAL:

Qualification - Required

METHOD	REQUIREMENT OR TEST	NOTES	CONDITIONS	SYMBOL	LIMITS		UNIT
					MINIMUM	MAXIMUM	
	First article testing	37					
1011	Humidity	13, 21	No voltages	---	---	---	---
1006	Salt spray	13, 21	No voltages	---	---	---	---
1136	Rough handling	23		---	---	---	---
---	Vibration	13, 16, 35	F = f to 55 Hz; 0.06 inch double amplitude	ΔGss	---	0.5	dB
---	Shock	5, 13, 16, 35		ΔGss	---	0.5	dB
	Quality conformance inspection, part 1	6					
4289	Heater current	12		If	0.19	0.24	A
1266	Grid current	12		Ic1-Ic5	0	50	μAdc
4253	Gain, small signal	7, 17	Po = 0 dBm (max)	Gss	35	48	dB
4253	Power gain	8, 9	F = F1 thru F5	G	---	---	dB
4251	Output power and gain variation	7, 17 7, 17	Small signal Fine grain gain characteristics	ΔGss ---	--- ---	4 ±0.75	dB dB
4260	Noise figure	29	F = F1 thru F5	NF	---	10	dB
4254	Saturated rf power output	3	F = F1 thru F5	Po	10	20	dBm
4256	Input and output match	1	No voltages	VSWR	---	2.0:1	---
---	Overdrive power	19	F = F1 thru F5	---	---	---	---
---	Gain compression	31	F = F1 thru F5	ΔGss	---	1	dB
	Quality conformance inspection, part 2						
4261	Stability	26	No rf input	---	---	---	---
4257	Amplifier insertion loss	10	Pi = 10 dBm; no voltages	L1	70	---	dB
4261	Spurious output:						
	Input terminal	36	No rf input	---	---	-65	dBm
	Output terminal	36	No rf input	---	---	-30	dBm
	Output modulation	33	F = F3	---	---	---	---
4263	Gain, control (small signal)	32		ΔGss	70	---	dB
4266	Direct-interelectrode capacitance	4	No voltages	C	---	40	pF
4258	Radio interference shielding	34	F = F1, F3, F5	---	---	---	---
1367	Magnet polarity and strength	18		---	---	---	---
---	Temperature, altitude	14, 15, 20		---	---	---	---

NOTES:

1. No glow shall be permitted on any part other than the numeral under test.

2. No permanent shorts or opens shall be permitted.

3. On each plane the 10 cathodes shall be sequentially energized at the test conditions.

4. Light output of each numeral is measured with a foot-candle (ftC) meter and an eye-corrected photronic cell. The entire cell area is illuminated and is coupled to the tube by a light-tight cylinder so that the face of the cell is 1.5 inches from the tube base.

5. Centerline of numerals, drawn through the top of the numeral support posts, shall be within the tolerance specified hereon in relation to the line drawn on the base of the tube through pins 6 and 12.

6. Shock test shall be made on any shock machine capable of producing a half-sine-wave-shock waveform of the specified duration and amplitude. No voltages shall be applied during this test. Each tube shall be subjected to a total of 20 shocks, i.e.; five shocks in each of positions X, Y, Z plus, and Z minus in any sequence. This is a destructive test. Tubes that have undergone destructive tests shall not be delivered on the contract or order.

7. Tubes shall be energized with a duty cycle greater than 90 percent.

8. The life-test sample from the first lot each month shall continue on life test for an additional 1,000 hours (2,000 hours total life-test time). 2,000 hours' end point shall be the same as the 1,000-hour end points. life test (2). Failure of this 2,000-hour life test shall result in the following action. Acceptance of subsequent lots shall be dependent on each lot passing the 2,000-hour life test until such time as three consecutive lots pass the 2,000-hour life test. At this time acceptance will revert to the 1,000-hour life test with only the first lot of each month continuing to 2,000 hours as before.

9. Group C, life-test sampling plan, and Group C, establishment of prerelease eligibility (MIL-E-1 paragraphs) should be used with the following exceptions:

   (a) Group C, life-test sampling plan.

      (1) The first sample size = 3.
      (2) The first cumulative sample size = 3.
      (3) The second sample size = 3.
      (4) The second cumulative sample size = 6.

   (b) Group C, establishment of prerelease eligibility.

      (1) A minimum of 15 tubes shall------etc.
      (2) Replace all reference to the current 4-tube sample with current 3-tube sample. Replace all reference to the last 16 with the last 15.

10. One tube shall have the top numeral cathode glowing steadily. One tube shall have the bottom numeral cathode glowing steadily. One tube shall have the "0" numeral cathode glowing steadily.

Custodians:
Army - EL
Navy - EC
Air Force - 80

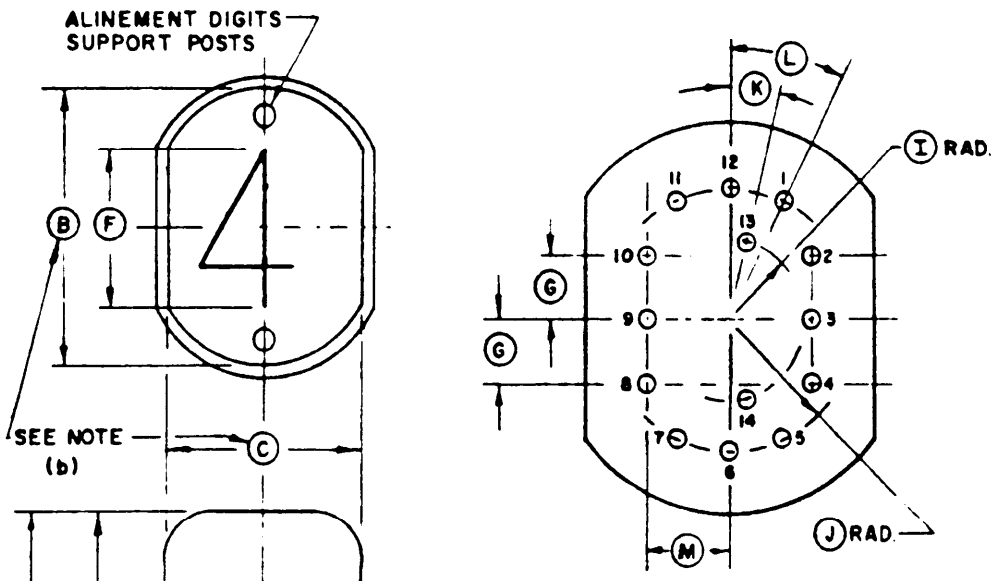
Review activities:
Army - EL, MI
Navy -
Air Force - 11, 17, 80
DSA - ES

User activities:
Army - WC
Navy - AS, OS, MC, CG, SH
Air Force - 19

Preparing activity: Army - EL

Agent: DSA - ES

(Project 5960-2401-96)



NUMERAL DESIGN

PIN CONNECTIONS			
Pin No.	Element	Pin No.	Element
1	anode	8	k4
2	k0	9	k3
3	k9	10	k2
4	k8	11	k1
5	k7	12	int con
6	k6	13	int con
7	k5	14	int con

Ltr	Dimensions in inches with metric equivalents (mm) in parentheses	
	Minimum	Maximum
Quality conformance inspection, part 2		
A		1.120 (28.45)
B		1.020 (25.91)
C		.790 (20.07)
D		.862 (21.89)
E		.064 (1.63)
F	.595 (15.11)	.625 (15.87)
Reference dimensions (see note a)		
G	.170 (4.32) (also applies to pin pairs; 8&9; 2&3; 3&4)	
H	.040 (1.02) (pin diameter)	
I	.210 (5.33) (also applies to pin 13)	
J	.340 (8.64) (also applies to pins: 1, 12, 5, 6, 7)	
K	13°	
L	26°	
M	.220 (5.59) (also applies to pins 8, 9, 10, 2, 3, 4)	

NOTES:
a. Reference dimensions are for information only
b. Applies to entire length of bulb.

FIGURE 1. Outline drawing of electron tube type 8422.

FOLD

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Headquarters
U.S.Army Electronics Command
Fort Monmouth, New Jersey 07703

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SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 22-R255

INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.

SPECIFICATION
MIL-E-1/1519A, Electron Tube, Numerical Indicator Type 8422

ORGANIZATION

CITY AND STATE

CONTRACT NUMBER

MATERIAL PROCURED UNDER A
☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO *(If "yes", in what way?)*

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity - Optional)*

DATE

DD FORM 1 JAN 68 1426

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

ESC-PM 1068-68

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